

**Minutes of the
IPCC Scoping Meeting for a
Special Report on Renewable Energy Sources and
their Role in Climate Change Mitigation**

**Artur Braun
Laboratory for High Performance Ceramics**



Minutes of the IPCC Scoping Meeting for a Special Report on Renewable Energy Sources and their Role in Climate Change Mitigation

IPCC Working Group III - Mitigation
Lübeck, 20. – 25. January 2008



Decision to prepare for a scoping meeting for a special report on renewable energy sources and their role in climate change mitigation.



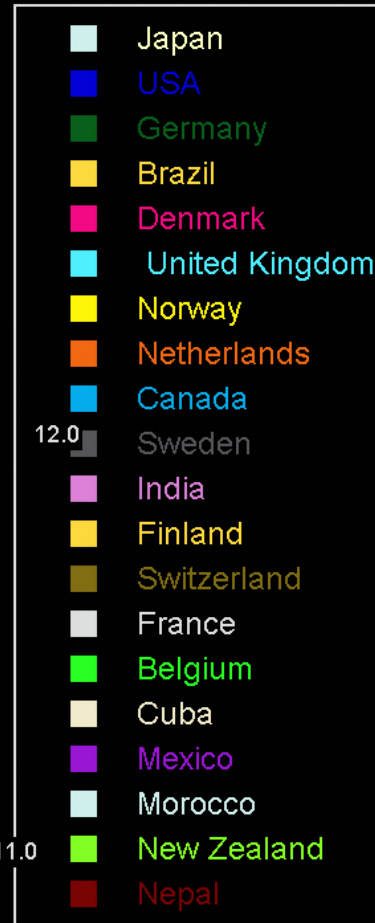
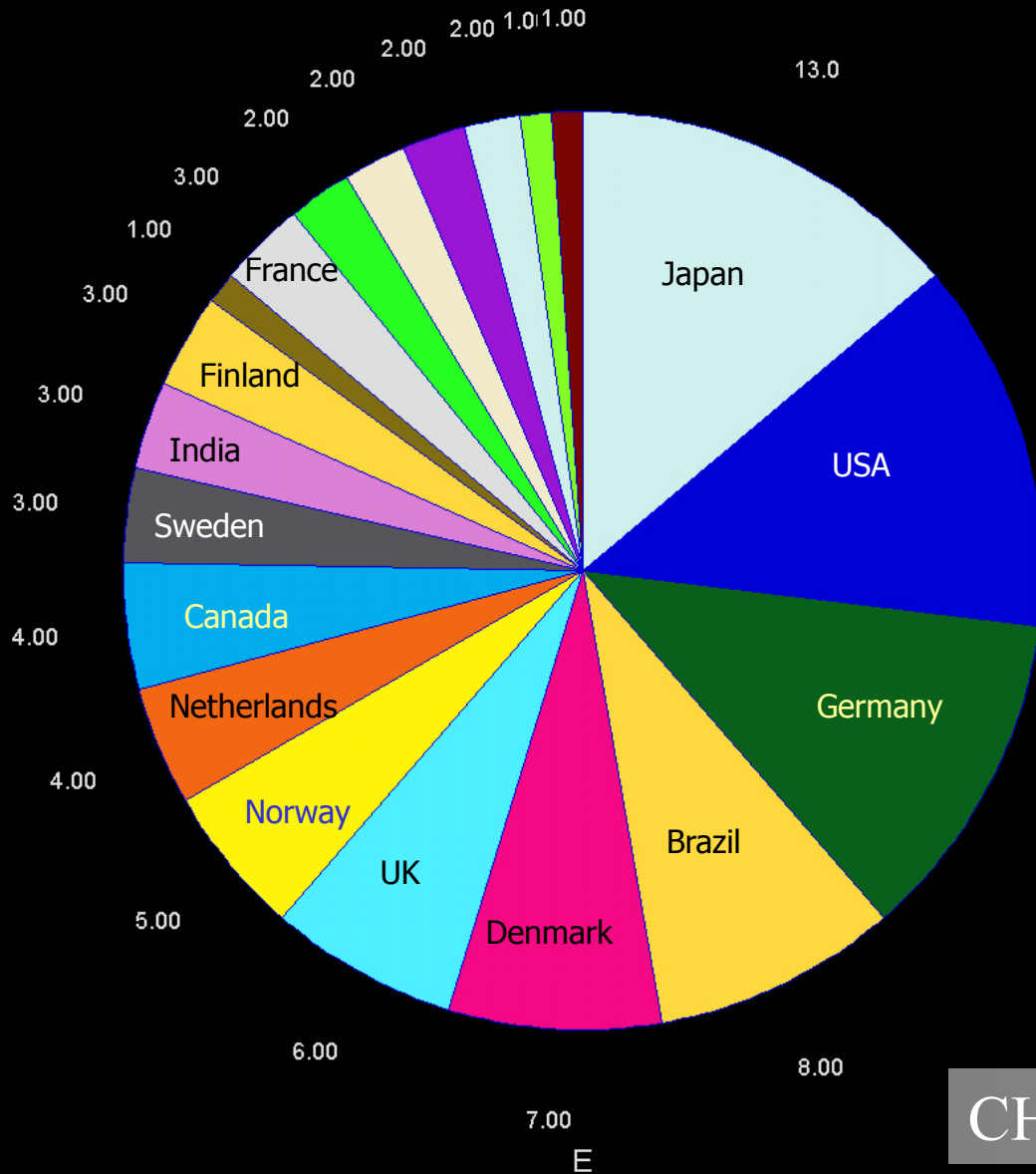
This scoping meeting was held in Germany/Lübeck in January 20 – 25 2008.

„Swiss“ Participants in Lübeck:

J.-L. Scartezzini, EPFL
R. Wüstenhagen, USG
A. Braun, EMPA

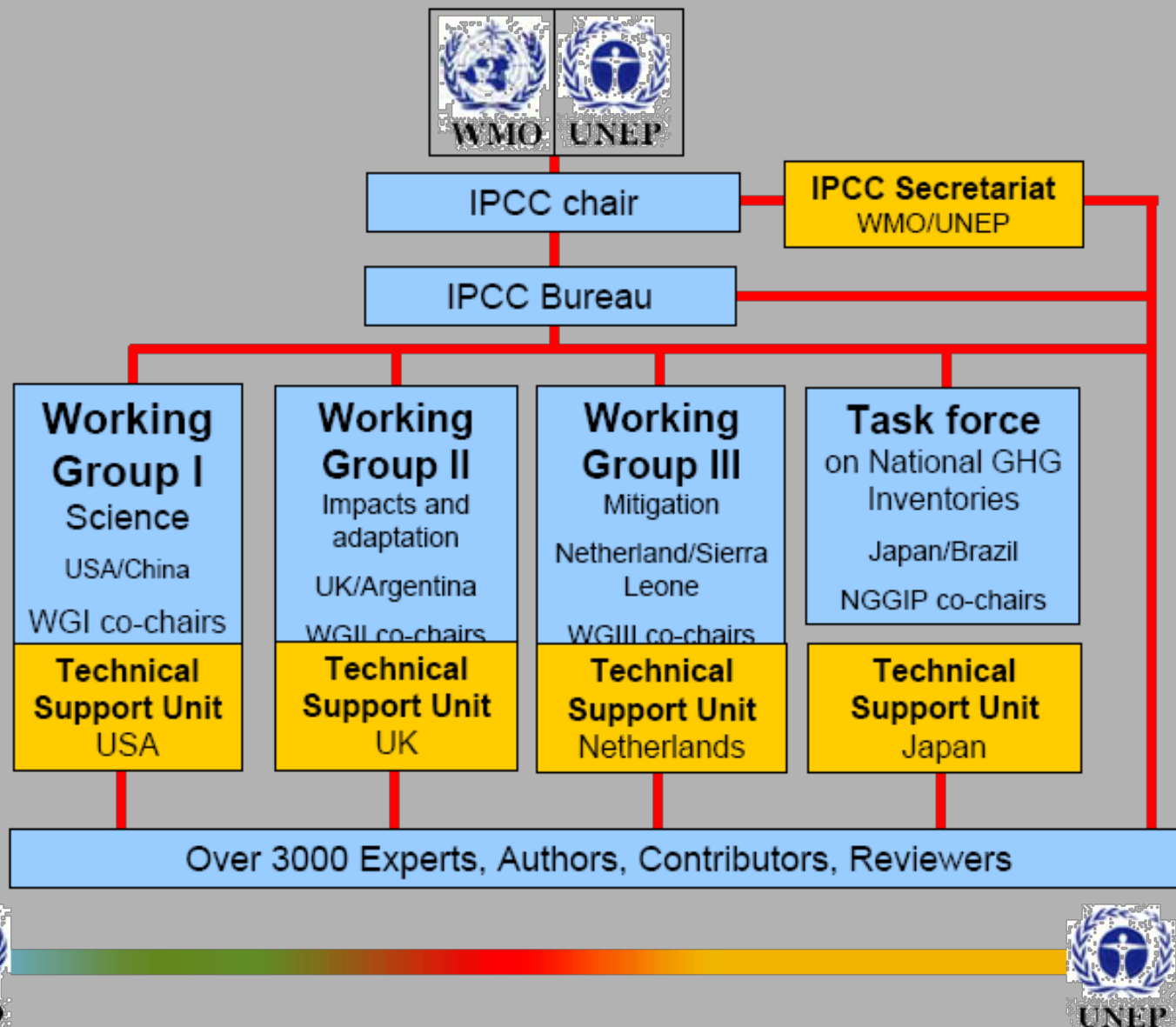
Participants by Nationality

in Lübeck



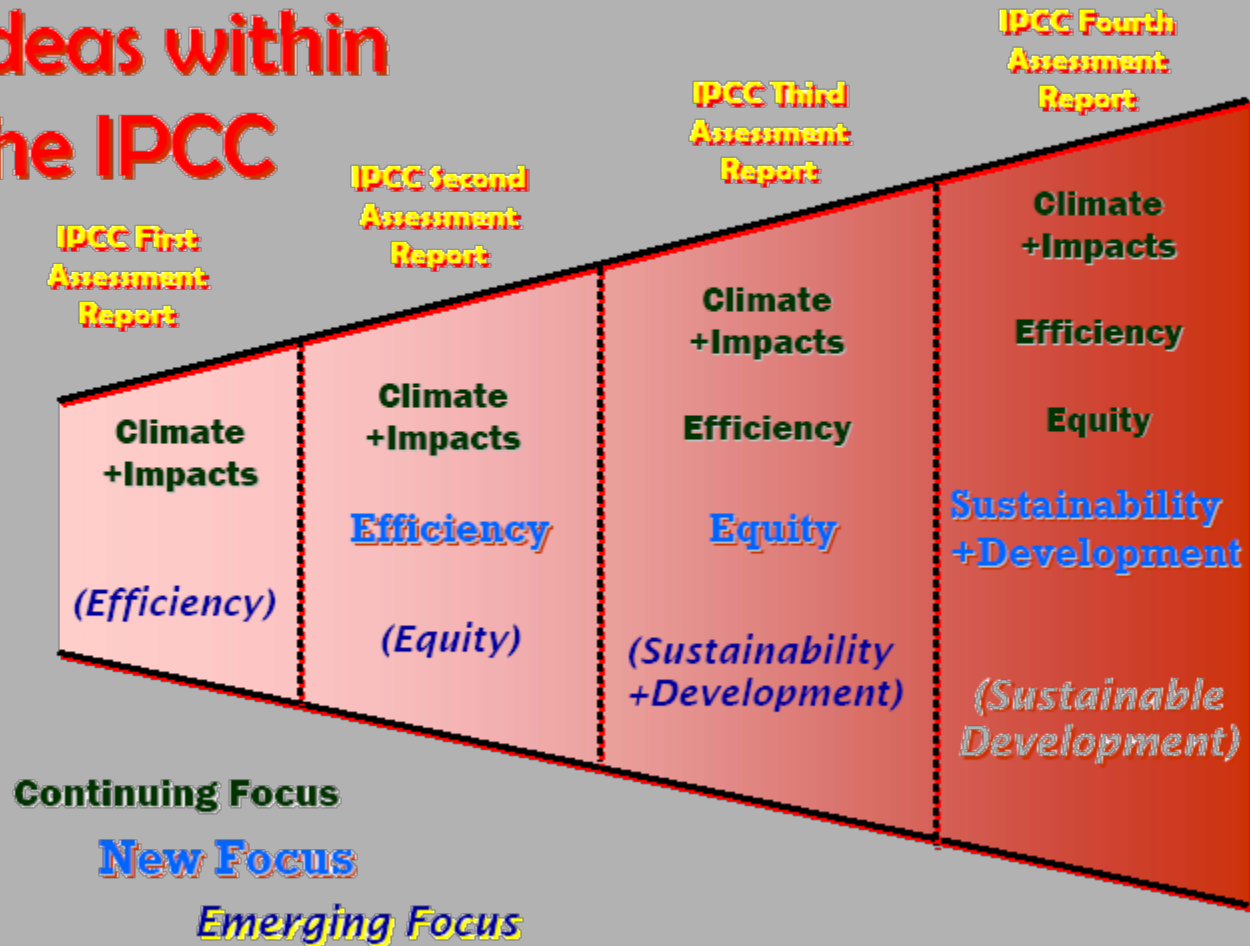
Albania
Bangladesh
Egypt
El Salvador
Eritrea
Iceland
Indonesia
Hungary
Tonga
Benin
Macedonia
Sao Tome & Principe
Sierra Leone
Sudan
Zambia

CH actually sent 3 Scientists



Courtesy Ogunlade R Davidson, Co-Chair, Working Group 111

The Evolution of Ideas within the IPCC



Courtesy Ogunlade R Davidson, Co-Chair, Working Group 111

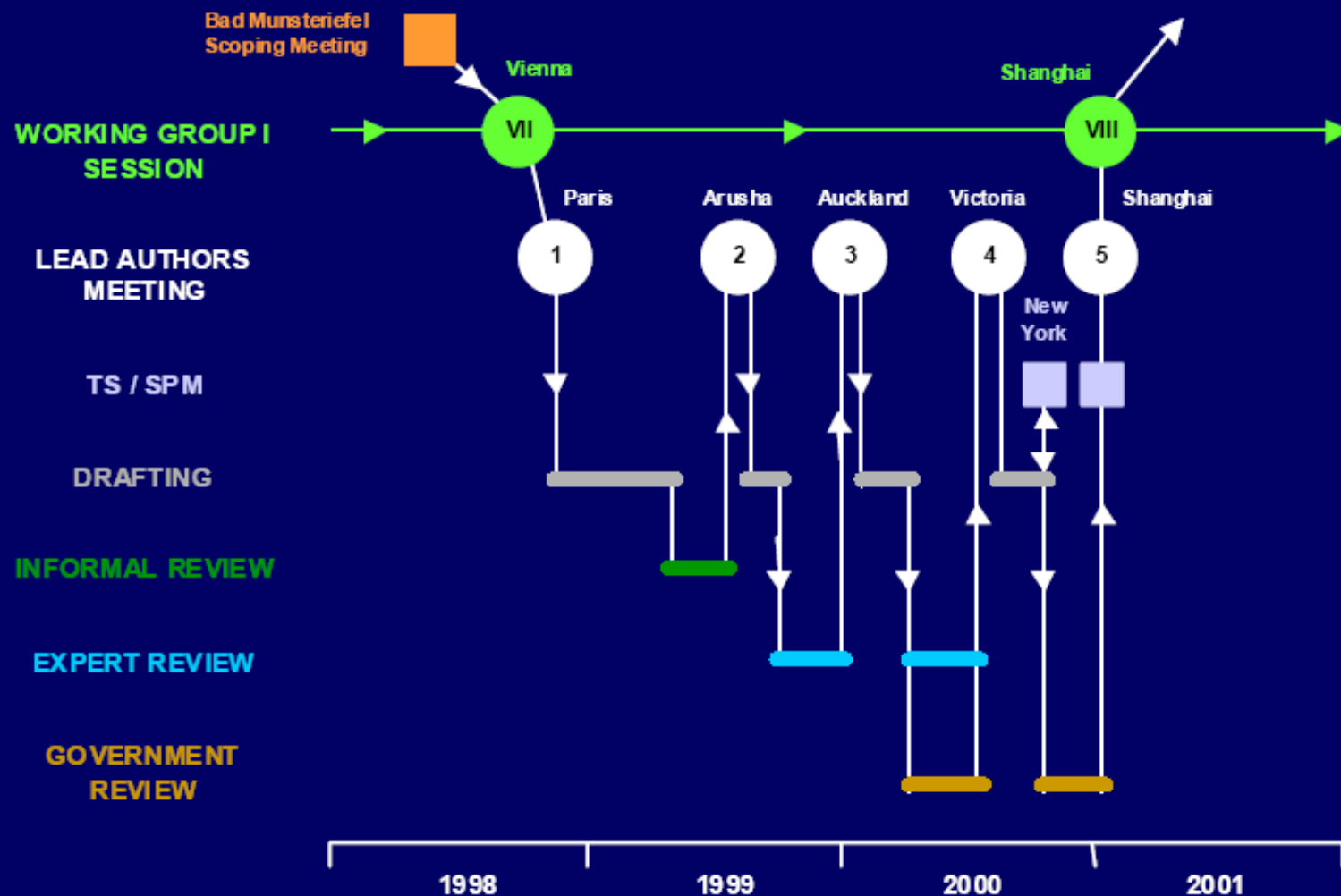
The process of deciding on a report

- Suggestion of a new report (a country or international body)
- Decision by the IPCC to have a scoping process
- **Scientists are asked to review the need and draft a structure (scoping document; this was done in Lübeck in January)**
- IPCC Panel discusses the suggested structure and decides to have (or not) to have a report
- Scientists produce report, technical summary (TS) and draft summary for policy makers (SPM)
- IPCC Panel goes through a word by word approval process and finally accepts SPM in consensus
- Approval of the full report and the TS

The steps of compiling a report

Scoping ⇒ Drafting ⇒ Review ⇒ Redrafting ⇒ Final approval

Key steps in preparation of Working Group I (science) component of Third Assessment Report



Source: Houghton 2001

Agreed upon structure of the scoping report on renewable energies as of 22 Jan 2008

1. Introduction: Renewable energy and climate change

- i. The task of the SR REN
 - ii. Scope, structure and function of this Special Report
 - b. Resources for Renewable Energy
 - i. General advantages of renewable energy sources
 - ii. Global resources (solar, tidal, geothermal); theoretical potential
 - iii. Regional (and local) distribution of the potential
 - iv. Effects of climate change on these potentials
 - c. Basic forms of energy supplied by renewable energy sources
 - i. heating and cooling and cooking
 - ii. electricity
 - iii. transport
 - iv. mechanical and others
 - d. Context of energy efficiency and other forms of energy supply
- Renewable energy source chapters all containing technical, socioeconomic and environmental matters (*) including mitigation potential, costs of renewable energy systems (including regional potentials and conditions) / level of maturity/;

2. Biomass

3. Direct solar energy

4. Geothermal energy

5. Hydro power

6. Ocean energy / osmotic

7. Wind energy



8. Integration of renewable energy into present and future energy systems in the context of overall climate change mitigation strategies, incl. costs and benefits of transition

a. Energy demand potentially met by renewable energy sources in the future

- i. heating, cooling, cooking
- ii. electricity
- iii. transportation
- iv. Non electric illumination
- v. Mechanical power

b. Grid management

c. Transmission / transport of energy

d. Storage

e. Infrastructure

f.

g. Integration with total energy systems including other energy sources and energy efficiency

9. Mitigation potential and costs of transition? (mitigation benefits)

(Summary table), +, +, +

10. Mitigation co-benefits, environmental impacts of renewables and social issues and the context of sustainable development

11. Deployment of renewables

a. Policies and measures (incl. R,D & D)

b. Barriers

c. Opportunities

d. Financing and insurance of renewable energy systems

e. Capacity building

f. Technology transfer, adaptation and diffusion

OCEAN ENERGY

1. Introduction

2. Resource

(theoretical potential; regional differences; temporal availability; data for technical potential on all energies but not covering all regions; evolution of resource under climate change)

- wave
- tidal and ocean currents
- ocean thermal gradient
- salinity gradient

3. Wave energy

- Technology and applications: status and current trends
 - overview (3 concepts / 10 different types of technologies fitting different local conditions)
 - different stages of development
 - electricity production
 - integration issue: grid availability in some areas; intermittency (but predictable)
- Global and regional status of market development and deployment
 - no installed capacity (2 or 3MW in Scotland and Portugal),
 - market stage to be expected around 2011 (before 2020),
 - Market support (feed-in tariffs, certificates) for development available in European countries.

4. tidal and ocean current energy

- Technology and applications: status and current trends
 - tidal barrage (commercially viable and developed in some places in the world)
 - tidal streams (same as wave)
 - oceans currents (conceptual stage with potential, beyond 2020)
- Global and regional status of market development and deployment
 - tidal barrage (Russia, USA, France and Korea ,India coming)
 - tidal streams (same as wave)
 - oceans currents (beyond 2020)

5. ocean thermal energy (OTEC)

- Technology and applications: status and current trends
 - open cycle / closed cycle
 - pilot stage, few developments,
 - time frame for commercialization depends upon policies and investments,
 - electricity, co benefits (desalination, biomass)
- Global and regional status of market development and deployment
 - no commercial deployment
 - pilot in USA and Japan

6. osmotic energy

- Technology and applications: status and current trends
 - R&D stage,
 - electricity,
- Global and regional status of market development and deployment
 - Norway

Key message:

four very different resources,
very high potential,
emerging technologies, running very fast because the prototypes are developed at market size (modular technology),
breakthrough / bringing down the cost is based on engineering,
tidal barrage is a mature technology.
widely distributed, some resource are present in each region of the globe

7. Environmental and social impacts

- wave energy
 - anticipated to be low, but not yet fully explored given the low stage of development of the technology,
 - completely new industry, social impact expected to be high (20 jobs /MW),
 - conflict of use of ocean space.
- tidal and ocean current energy
 - tidal barrage (change in the ecology of the estuaries, bridge / connexion)
 - tidal streams (anticipated to be low, migrating fish)
 - ocean currents (unknown)
- ocean thermal energy (OTEC)
 - anticipated to be low, but not yet fully explored given the low stage of development of the technology,
- osmotic energy
 - anticipated to be low, but not yet fully explored given the low stage of development of the technology

8. Future technological improvements

- wave energy
 - increase in efficiency of conversion expected,
 - increase in availability (control, intelligence in the system / harnessing energy in a broader range of sea states)
- tidal and ocean current energy
 - tidal barrage (reduce environmental impacts ?)
 - tidal streams (same as wave)
 - oceans currents (no present technologies)
- ocean thermal energy (OTEC)
 - material improvements making the technology more efficient in energy conversion and more robust,
- osmotic energy
 - membrane material improvement (transferred from water treatment industry) could raise energy conversion efficiency and make the technology more robust,

9. Potential deployment and costs potential

- wave energy
 - cost reduction because of mass production (Cf. Carbon Trust UK),
 - farm scale of MW size in general
 - non-technical barriers: absence of legal framework for project offshore developments, conflict of usage, (fishing, ship lines, natural areas, military areas, submarine cables),
- tidal and ocean current energy
 - tidal current: cost reduction because of mass production, farm scale of MW size in general and non-technical barriers for offshore developments(same as wave), military
 - tidal barrage: not a big potential of development because of environmental constraints,
- ocean thermal energy (OTEC)
 - cost reduction because of mass production,
 - non-technical barriers for offshore developments: absence of legal framework for project offshore developments, conflict of usage, (fishing, ship lines, natural areas, military areas, submarine cables),
- osmotic energy
 - cost reduction with mass production of membranes

- Ocean Energy



Ocean Energy Potential

- The theoretical global resource is estimated to be in the order of:
 - 8,000 - 80,000 TWh/year for wave energy;
 - 800 TWh/year for tidal current energy;
 - 2,000 TWh/year for salinity gradient energy;
 - 10,000 TWh/year for ocean thermal energy
- No OE potential has been reported by ICCP

Worlds electricity consumption 16,000 TWh/year

Source: EC SET plan, World Energy Council

IPCC JAN 2008



Financing and Insurance of Renewable Energy Systems

Eric Usher

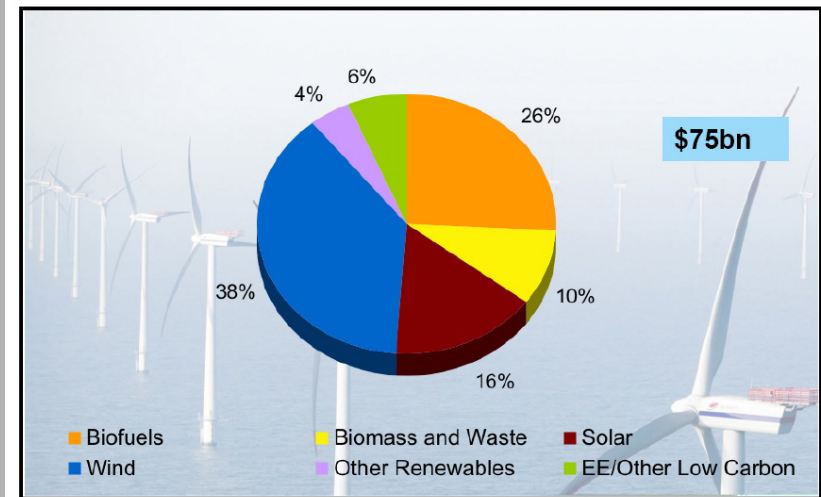
*IPCC Scoping Meeting on Renewable Energy Sources
Lubeck, Germany, January 20-25, 2008*

How is tracking \$\$ different from MW ?

- Measure of:
 - The Present** -> \$ invested in new generation
 - how much RE being installed and at what cost
 - The Near-term future** (1 to 3 yrs out) -> \$ invested in new manufacturing capacity
 - how quickly are RE sectors expanding
 - are bottlenecks being addressed
 - The Mid-term future** (3 to 10 yrs out) -> \$ invested in new technology
 - maturity of sectors;
 - expected mkt demand
- Not a good measure of:
 - The Long-term future**
 - Investors don't see further than 10 years into the future.

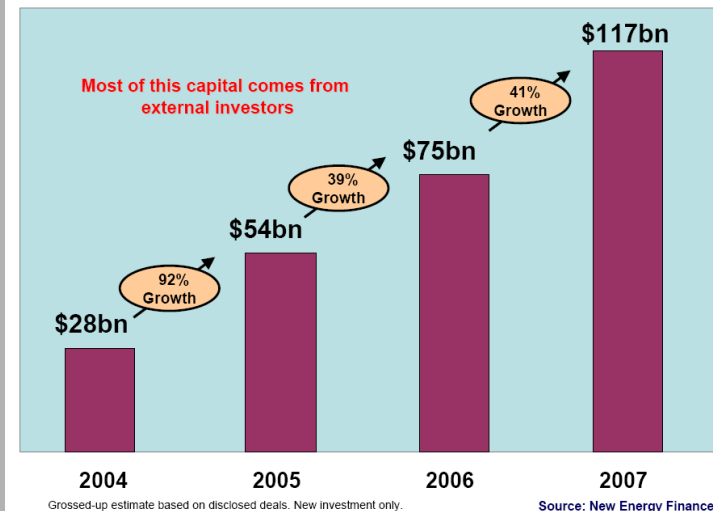
Crystal Ball - Investments being made based on estimates of tech. potential and future market size

Global Investment by Technology, 2006



Across a diversified portfolio of technologies.

Global Investment in Sustainable Energy



Investment has taken off since 2004

Decision on report to be made at 28th session in Budapest, 1-10 April 2008



INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



INTERGOVERNMENTAL PANEL
ON CLIMATE CHANGE

TWENTY-EIGHTH SESSION
Budapest, 9-10 April 2008

IPCC-XXVIII/Doc. 1
(5.II.2008)

Agenda item: 1
ENGLISH ONLY

PROVISIONAL ANNOTATED AGENDA

6. POSSIBLE IPCC SPECIAL REPORT ON RENEWABLE ENERGY

The Panel at its 25th Session considered the issue of renewable energy and decided to carry out a scoping meeting for a possible special report on renewable energy in late 2007, after completion of the AR4. The Panel also decided to consider in early 2008 the outcome of the scoping meeting and take a decision on whether to prepare a Special Report on Renewable Energy, its scope and work programme.

The scoping meeting was held from 21-25 January 2008 in Lübeck, Germany. The Panel is invited to consider the outcome of the scoping meeting and take a decision on the matter.



WMO

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

IPCC Working Group III — Mitigation



UNEP

Date : November 30th, 2007
Our Ref. : 405/07 IPCC OD BM/PB/Th
Subject : **Invitation Scoping Meeting on Renewable Energy Sources,
20-25 January 2008, Lübeck, Germany.**

We have the honour of inviting you to the IPCC scoping meeting on Renewable Energy Sources, scheduled to be held from 20 to 25 January 2008, in Lübeck, Germany.

At its 25th Session Mauritius, 26-28 April 2006, the Panel considered a proposal for an IPCC Special Report on Renewable Energy. Many countries expressed general support for such a Special Report. In the plenary meeting, the Panel acknowledged the importance of renewable energy systems and decided to hold a scoping meeting for a possible Special Report on Renewable Energy after the completion of the AR4. The Scoping Meeting aims to prepare a scoping document for a decision by the IPCC Plenary. Based on the outcome of the Scoping Meeting the Panel at its 28th Session in April 2008 will decide on further IPCC work on this issue.

The scoping paper should identify the aspects that would need to be covered in an IPCC assessment and the availability of published scientific information. It should also address the question if a Special Report is to be recommended, or that the option of assessing the information to be a part of the Fifth Assessment Report would be preferable. The workshop programme is designed to give an overview of the state of knowledge in different areas related to renewable energy sources. Subsequently, in breakout meetings, working groups will be asked to prepare input for the scoping paper that will be drafted by a small group during the last day of the meeting.

It is with great pleasure that we extend this invitation to you for attending this workshop, based on your expertise and experience in this area of research. We request that you complete the appropriate form in the attachment and forward it to Tom Trittin, IPCC Working III Extended Technical Support Unit at fax +49 461 8052532 or email tom.trittin@uni-flensburg.de no later than December 4, 2007. As soon as your registration has been received, you will be informed on further details concerning the accommodation and practical issues during the Scoping Meeting.

Limited financial support is available from the IPCC Trust Fund to representatives from developing countries and countries with economies in transition. The Trust Fund supports travel and accommodation costs. In order to facilitate travel arrangements it will be important to adhere strictly to the registration deadline of 4 December 2007.

Accept, Sir/Madam, the assurance of my highest consideration.

Bert Metz
Co-chairman IPCC Working Group III

Ogunlade Davidson
Co-chairman IPCC Working Group III

Enclosures:

1. Registration form Scoping Meeting
2. Scoping Meeting Programme

